An Inaugural Dissertation,
on that Species of Disordered Respiration,
denominated Asthma Convulsivum.

by

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To render the proximate cause of this disease evident, I shall take a general view of the structure of the air cells, and the action of the pulmonary organs. The Larynx is formed by an assemblage of cartilages, to the lower extremity of which, is attached, a membraneous and muscular tube, called the Trachea. This is composed of twenty or more narrow cartilages, of a circular figure, having a deficiency at the posterior part, filled up by muscular fibres, running in a transverse direction; this deficiency behind have led physiologists to suppose it intended, to facilitate the passage of aliment, through the oesophagus, but this opinion is rendered improbable

by the fact, that the oesophagus is not intimately connected, with the posterior part of the Trachea. In addition to this, it has been observed, that a similar arrangement exist, in the larger branches of the branchiae, which would not be neceſsary, if intended alone for this purpose; and nature has destined this for a more important function. In addition to this muscular structure, there is another no leſs evident, consisting of longitudinal fibres, occupying the interstices, between the cartilages. Now it is probable that these muscular fibres, are intended to leſsen the dimensions of the tube, in order that collections of mucus, pus, and other extraneous matters may be expectorated with ease. That this arrangement facilitates expectoration cannot I think be doubted; for an exertion being made, not only

the muscles of respiration are brought into direct action, but the abdominal muscles being aſsociated with them, the capacity of the Thorax is leſsened, in all its dimensions; and the air being expelled from the lungs, with considerable force, rushes through the Trachea, which being leſsened in diameter, any mucous or Substance adhering to it, is forcibly discharged. This view of the subject was first delived by our distinguished profeſsor of Anatomy, Dr. Physick, the first person I believe who satisfactorily explained the use of this structure. The cartilaginous rings of the Trachea act as elongators to the muscular fibres. (J Hunter). As the branchia and the air cells of the lungs are derived from, or are the immediate ramifications of the Trachea, it is

presumable that they are of a similar Structure, though not so evidently muscular and cartilaginous. I may also observe that as the bronchia and air cells are in many instances, loaded with phlegm &c.; they must poſseſs the power of contraction in a more eminent degree, than even the Trachea; for there is leſs expulsive force, received from the air; and consequently, the inherent power of contraction must be greater; resembling in this particular the ramifications of the aortal System. The cartilaginous Structure in the minute branches of the bronchia are very indistinct; hence the antagonizing power must be in a great measure wanting. This opinion is supported by the nature of those medicines which promote expectoration. Their properties are of such a

nature, as would lead us to suppose, their operation depended, on stimulating these fibres to contract. (I allude to the stimulating class, as Squills, ammoniacum &c.) The lungs constructed in this manner are subservient to the important function of respiration, and for this purpose are in perpetual motion. This action has been attributed to the alternate action of the ~~Phrenic Muscles~~ Diaphragm; associated with which are the abdominal, intercostal, and other muscles; and the lungs have been considered as altogether passive organs in the process. That the diaphragm is the principle agent in the process, is proved beyond doubt, by those injuries of the Spine above the origin of the Phrenic nerves, being productive of immediate death, by stopping the action of this muscle.

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Yet I consider the bronchia, and air cells to assist in this process, in the following manner. It has been ascertained by Physiologists, that the oxygen of the atmospheric air, received into the lungs, undergoes a change, combining with the carbon evolved in the lungs, forming carbonic acid gas; the heat imparted to this air by the system, produces an expansion, this distends the air cells of the lungs, the muscular fibres of which, being stimulated to contract, and the Diaphragm assisting in the operation, the air is expelled: after this the Diaphragm contracts, the air cells return to their former dimensions, which produces a vacuum; thus the atmospheric air fills a second time, the heat again imparted to this air, produces again the stimulus of distention, and its other effect. But in asthma, the muscular

fibres composing the air cells, cannot contract and dilate so readily in consequence of the spasmodic constriction affecting them; and it is this, which produces the difficulty of breathing, and other distressing effects which characterize the complaint. That there is a vacuum in the cavity of the chest is rendered certain by a circumstance well known to Surgeons, I allude to those wounds of the chest, in which the cavity of the pleura is penetrated; in this case the lung on the injured side is collapsed, & unable to perform its function, being interrupted, by the air rushing through the wound, into the cavity of the pleura, & filling up the vacuum

Having premised these general observations, I shall now proceed to the history of the disease under consideration Nosological writers have divided

Asthma into two Species, viz. The Spasmodic or dry, and the Humoral or expectorating. As these two kinds of Asthma exact a mode of treatment precisely similar, Profeſsor Chapman has thought proper to reject this diviſsion as useleſs. Asthma has also been distinguished into Idiopathic and Symptomatic. Experience fully evinces the propriety of this Claſsification. The remote causes, may be divided into those acting immediately on the lungs, and such as affect the lungs secondarily. Under the former head may be arranged the fumes of certain metals as Arsenic &c. dust and the odour of certain substances, as Ipecacuhana &c. as also certain states of the atmosphere — Among the causes which secondarily affect the lungs, the most prominent are dyspepsia, and other

derangements of the stomach & alimentary canal. In such cases, the lungs are sympathetically affected. Many other causes have been supposed to produce Asthma, as uterine irritation, &c. But there is reason to believe, that the effect produced in these cases, is owing to derangement in the stomach. The intimate connection between the uterus and stomach have been noticed by all writers on the subject. There is scarcely a disease of the uterus, but induces a derangement in the stomach. It is ~~by~~ not unusual, for hemorrhage from the uterus to subside, upon vomiting coming on spontaneously; yet it is generally acknowledged, that emetics, instead of putting a stop to the hemorrhage, decidedly aggravate it. It appears strange that the same effect, differently induced, should produce such opposite results; but in the

former instance, I presume that the stomach is the principal agent, in the act of vomiting; but when excited by Emetic medicines, the diaphragm, and abdominal muscles are brought into violent action; which by preſsing on the blood veſsels, determine the blood to the uterus, & thereby aggravate the mischief. The same reasoning may be applied to the exhibition of Emetics ✓ in pregnancy, which irritate and excite the uterus into premature action. The paroxysms of Asthma are most frequent in warm weather; the reason of this is very obvious: heat relaxes the surface, and in that way weakens the digestive organs; and also by debilitating the system generally, by profuse perspiration. Nothing so effectually invigorates the digestive organs, as the **cold** bath: provided the system is in a "Susceptible condition"

Certain districts of country, also predispose to asthma, without any assignable cause. Sudden changes from heat to cold, & the reverse, repelled eruptions, metastasis of gout, &c. the odour of certain substances, as Ipecacuhanha, four or five cases of this Kind are on record. The paroxysm is most frequent at midnight, particularly after the first sleep. The cause of this is not very clear. May it not be owing to the action of the stomach being more feeble at this period than at any other time? or probably the function of respiration is less active at the close of the day. Analogy certainly favours this opinion, as the arterial and other animal functions are generally considered, as less vigorous at night. Dr Darwin attributes it, to the accumulation of Stimuli during Sleep. I shall now proceed to describe the

phenomena observable in a paroxysm: A day or two preceeding the attack, there are certain signs, denoting a disorder of the primæ viæ: these are a sense of distention, flatulency, costiveness, and eructations; there is also pain in the head. As evening approaches a sense of tightness in the chest is perceived, together with an aggravation of the other symptoms; a pain above the eyebrows is a very common attendant; the patient is irritable; as regards the appetite, there is, sometimes, a disposition on the part of the patient to eat, and if indulged uniformly hastens, and aggravates, the approaching paroxysm. At this time there is no very evident alteration of the pulse; it is often quicker than natural. These are the symptoms preceeding the attack very generally; but in some

instances very few of these are observable. The patient retires, but about midnight he awakes, with considerable difficulty of breathing, attended with a wheezing noise, a sense of weight on the Diaphragm, and Straitness in the lungs; he immediately and as it were instinctively flies to the window for cool air; and as the difficulty of breathing is greatest in the recumbent posture, he studiously avoids it. When the paroxysm is at its acme the pain in the head is very distressing, & the countenance is generally suffused, but at other times is pallid and sunk, indicating considerable anxiety and distress. Considerable stupor not unfrequently attends. The pulse is not a guide: sometimes it is frequent, small, & quick; but at other times is not much affected. The urine during the paroxysm is pale; but after the

termination it is high coloured, and sometimes deposits a sediment. If relief be not afforded, the symptoms will continue until morning, at which period, there will be a remission of the symptoms; the difficulty of breathing is lessened, particularly if expectoration is free; some ~~difficulty of breathing~~ pain in the head continues the next day, and all exertions distress the patient, with difficulty of breathing. The next evening, a second paroxysm takes place; and in this way the disease may continue for weeks, debilitating the patient, if the proper remedies, be not resorted to, & the remote causes continue to act. These are the phenomena, attending the most frequent form; but another form ~~variety of~~ of the disease, not unfrequently presents itself: in this the difficulty of breathing

is very considerable, the wheezing is very audible; the pain in the head is not so great, as in the former case; the countenance is pale, haggard, and anxious; the surface is cold, and partial sweats, not unfrequently occur; the pulse is feeble; partial diarrhoea sometimes takes place, the fear of dissolution is greater, and oedematous swellings occur. This is the same disease acting upon a debilitated and cachectic state of the system. Dr. Bree an ingenious writer on Asthma supposes ~~that the~~ mucus in the lungs, which is expectorated after the paroxysm to be a cause of the disease; and although he adduces analogical ~~evidence~~ evidence to support the opinion; yet he is certainly mistaken in this view: for in the first place, the disease is never

preceeded by this dicharge of mucous, and the mucous is seldom expectorated, before the second, or third day after the paroxysm: and in the second place, if this was the cause of the disease, we might at all times expect the dicharge, which is not the case; indeed the views of Dr. Bree on this subject, have been embraced by very few subsequent Authors. In the treatment of this disease, we must keep in view the remote causes, without this it is impoſsible to cure the disease. To simplify this, I have arranged asthma according to the remote causes, into three species. The first, and by far the most frequent cause, is irritation of the stomach, & other of the abdominal viscera. I believe asthma in almost all instances, to be a symptomatic disease, depending

on a disordered stomach: this sometimes brings the disease into action; & in all cases predispose to the attack; in this latter case upon the application of some of the other remote causes, the disease becomes developed. I have frequently observed that the action of a particular cause, would occasion a paroxysm at one time, and at other times, might be borne with impunity. The second species, is where it is occasioned by aerial acrimony. Of this kind are a rarified atmosphere, peculiar causes by which particular situations ~~are~~ obnoxious to asthmatics, effluvia arising from dusty articles; from Ipecacuanha, and metallic fumes.—

The third division, comprehends those depending on habit, or where after the removal of the cause

producing the disease, it still continues to act: this not unfrequently occurs, and it is to this form of the disease, antispasmodics, display so much power. These three diviſsions correspond with the three last diviſsions of the ingenious Bree. The proximate cause of Asthma is attributed by Cullen and most of the other authors to a spasmodic constriction of the air cells of the lungs. By Darwin the proximate cause of this and other convulsive affections is ascribed to violent exertions of volition, to relieve pain — (vide Zoonomia) Treatment. In the treatment of this complaint, the remedies may be considered under two heads. Those which are applicable during the paroxysms and those which are proper in the intermiſsion. It would be a useleſs

considerable, ~~In such cases~~ venesection is not only safe; but the relief afforded is often very striking; from XII. ℥. to XX. ℥. may be taken. Generally the dyspnœa, pain in the head, and other urgent symptoms, will subside, upon the flowing of the blood; and not infrequently the beneficial effect will be durable. Topical depletion may also be resorted to; cups applied to the back &c. Dr. Bree, who is opposed to blood letting in this disease, recommends, when it should be resorted to, that the blood should be drawn from the veſsel at intervals, and in small portions. This practice may be suited to the disease as it occurs in Europeans, but in this Country venesection is very generally serviceable in the cases, marked by the symptoms enumerated above.

In addition to the relief afforded, the system is protected from Hydrothorax, Consumption, and other diseases which result from ill cured pneumonic inflammation.

The remedies next in importance, are Emetics. The majority of practitioners, recommend emetics: the best in these cases is Ipecacuanha. This was first ~~introduced~~ introduced into ~~the~~ practice in the Treatment of this disease by Akenside. This is adapted to almost all cases of the complaint; & is equally suited to all stages. If exhibited previous to a paroxysm, particularly if brought on from excess in eating or drinking, which is frequently the case ʒi of Ipecac. will very often prevent the occurrence of the paroxysm; & during a paroxysm the relief afforded is often very striking. Ipecacuanha acts in this case 1st by in the Treatment

evacuating the contents of the Stomach. 2 By overcoming Spasm. 3. Determining to the Surface, and by that means removing pulmonary congestion. & 4th. By imparting tone to the Stomach ~ It is in this and in other Spasmodic affections that the Sulphas Zinci or white vitriol has been highly recommended as an Emetic. If after bleeding & the exhibition of an Emetic, the disease still continues, we must examine further into the case; and we will often find it to be kept up by the morbid irritability of the branchia & air cells. To remove which antispasmodics are the appropriate medicines. Of these Opium in combination with camphor or the last mentioned article by itself. The camphor should be suspended in milk, or diſsolved in Spirits, according to circumstances; the ~~most form~~ latter in these cases is generally

preferable. In ordinary cases grs. X will answer; but when, as will sometimes happen, the dyspnea & wheezing is very great, threatening immediate suffocation; where the restlessness of the patient is extreme, tossing from side to side, where the action of the pectoral, Serrati, & other muscles are brought into action, with the view of enlarging the capacity of the Thorax, the countenance pale, & the pulse feeble; in such cases ℈i of Camphor suspended in a wine glass full of brandy will afford great relief by making a powerful impression on the Lungs. The only objection to the exhibition of opium is the drowsiness it occasions. In slight attacks a dose of Laudanum will cure it often. The Sulphuric Ether in combination with Laudanum has been highly recommended: the following is the formula.

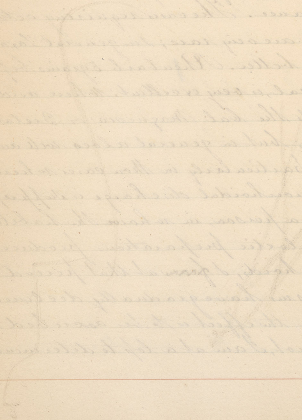
℞. Ether. Sulp: ℥i
Tinct: Theb: gtt xl.
M. ft. haustus.

To the list of Antispasmodics, may be added musk, Castor, assafœtida, Hyoscyamus & others which have been used occasionally with success, but not sufficiently to warrant my noticing them particularly. Those above mentioned will in general afford relief: provided the remedies be properly adjusted to the case. As a general rule antispasmodics are applicable to those cases alone depending upon habit — Inhalations in this disease must not be neglected: they relieve spasm, & promote expectoration. When used, the instrument invented by Mudge should be employed. The vapour of water, or vinegar often answers very well. Balsam Tolu has also been

~~have also~~ been used. The formula recommended by Dr Physick in cases of Catarrh, may I think, be advantageously used in the present case. It consists of Hoffman's Anodyne liquor, and laudanum, of each one drachm, The vapor of which is to be inhaled for half an hour or more. (Chapmans Therap.) The smoking of certain Substances have been recommended, as Tobacco & Stramonium. These have been supposed useless, & occasionally injurious by Bree; But Professor Chapman, whose experience with the latter article has been great, has derived much advantage from the practice. The factitious gasses so much in vogue at one time, do not at present excite much attention: they have been highly spoken of by Beddows & Farrier —

This completes the treatment in the paroxysm. In the intermission a purgative

should be given. In cases when the bowels are costive, Calomel for many ~~[illegible]~~ reasons should be preferred; & in some cases must be repeated. As a general rule purgatives should be discontinued as soon as the fæces aſsume a natural appearance. The cases requiring active purging are very rare; & in general Laxatives answer better. Rhubarb 5 grains before each meal, is very excellent. Where acidity prevails the Cal. Magnesia or Cretaceous mixture; but in general aloes will answer better: particularly in those cases where the hemorrhoidal discharge is suppreſsed. I know a person, in whom the habitual use of aloetic preparations produced hemorrhoids, & ~~from~~ at that period the paroxysms have gradually declined. Whether the effect is to be ascribed to this or not, I am at a loſs to determine.



I am disposed to attribute the effect, now to a very particular attention to regimen, & avoiding the exciting causes, together with that change which usually takes place in the system at the age of puberty. The fact is certainly interesting, & on that account I thought it worthy of notice. It might at first view appear, that blisters, would prove serviceable; but experience has not confirmed this opinion. In cases, however, depending upon the effusion of water in the cavity of the chest, perpetual blisters, as an auxiliary measure, to remove the effusion, may be resorted to with advantage. The Tart: Emet: plaister, may I think prove serviceable. A plaster of the Pix Burgundica is a very popular remedy, applied either to the front or back part of the Thorax.

The Digitalis has been much recommended by Dr Sugrue of Cork, an account of which is given by Dr Thomas. The particular cases, to which the Digitalis is suited, have not been pointed out. I should suppose it suited to those cases of the disease complicated with effusions in the chest, and general anasarca, in debilitated subjects. The prussic acid has also been recommended and the particulars may be seen in the work published by Magendie.

Having by the proper application of the above remedies, cured the complaint, the patient will be still subject to a return of the disease, upon the application of the remote causes. To effect a radical cure the patient should select his residence in a

country which is suited to his particular constitution. No precise rules can be given on this subject. In general, mountainous countries disagree with asthmatics. 2d If dyspepsia exists, it should be removed as speedily as possible, & the state of his bowels should be particularly attended to. The diet should be nourishing and light; his drinks of the mildest kind; he should take gentle exercise, & his clothing should be warm.

If the patient be young, and of a good habit, it may be radically cured; but in the aged and infirm it often proves extremely troublesome; & a cure cannot in all cases be effected. The appearances on dissection are various. When

death has suddenly taken place, no appearance of disease is visible: this is indirect proof of the disease being Spasmodic; & the Spasm relaxing after death: in other cases, effusion of serum in the Thorax; & not unfrequently the cellular structure of the lungs is filled with mucous. The stomach and other of the abdominal viscera are often found in a disordered state.